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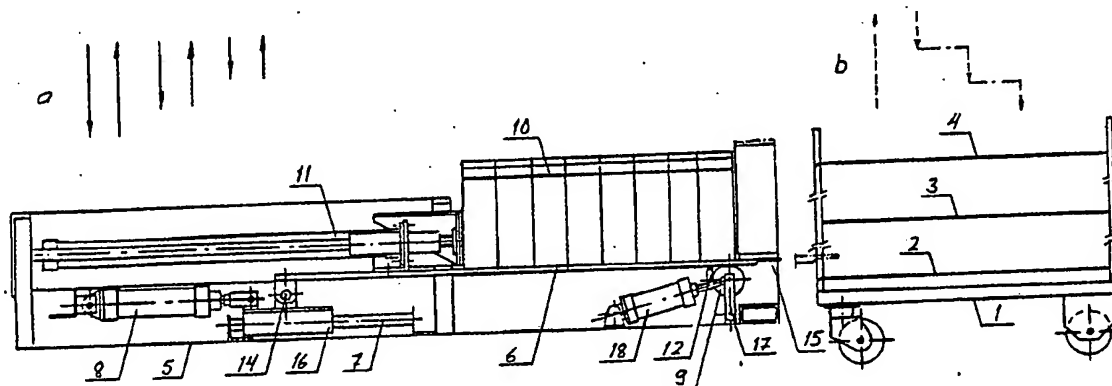
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(54) Title: AN APPARATUS FOR FILLING A TRANSPORT OR STORAGE RACK



(57) Abstract

An apparatus is described for filling a transport or storage rack (1) of the type in which there are several receiving levels (2, 3, 4), situated at predetermined distances on above another, on which one layer of packaged products (10) is placed at each given time. The object is, when the position of the receiving level deviates somewhat from the pre-estimated one and when the tolerances are small between the product height and the distances between the receiving levels, to ensure that the products can be pushed smoothly onto the receiving level. The filling device comprises a vertically moving grouping platform (5), which is equipped a lifting device for raising and lowering the platform to predetermined positions and with a pushing device (11) for pushing a layer of packages arranged on the platform to the corresponding receiving level (2) in the transport rack. What is raised is a supporting part (6), which supports the layer of packages and is equipped with a first set of power means (8) for transferring the supporting part (6) towards the receiving level (2) in such a way that it can push at least in part beyond the edge of the receiving level. Furthermore, there is provided in the grouping platform (5) a second set of power means (18) for producing an additional movement of the supporting part (6), which operate after the operation of the first set of power means (8) and ensure the lowering of the supporting part onto the receiving level (2).

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An apparatus for filling a transport or storage rack

5 The present invention relates to an apparatus for filling
a transport or storage rack of the type which has several
receiving levels situated at predetermined distances one
on top of another for the placement of one layer of
packaged products or the like at a time, the filling
apparatus comprising a grouping platform and lifting
10 devices for raising and lowering the grouping platform
or respectively the rack vertically to predetermined
positions, the grouping platform being equipped with a
pushing device for pushing a package layer arranged on
the platform to the respective receiving level in the
15 transport rack.

The apparatus according to the invention is intended
primarily for filling shop cart-racks, in which several
layers of products of the same type are stored, for
20 example milk cartons. A problem involved in filling these
is that between the shelves there is a very small
clearance in proportion to the height of the product, in
which case the apparatus must function with great precision
in order that a layer of products can be fitted in place
25 without the pushing member or the tops of the products
hitting against the selves. The difficulties are increased
by the fact that the positions of the shelves in different
carts may vary somewhat, and in addition, the thin support
pallet used for introducing a layer of packages reduces
30 the space available. If no pallet is used, the supporting
level of the package layer must be very precisely situated
on the plane of the shelf in order that the transfer be
smooth, and in addition, the pushing of the product into
the shelf easily causes the shelf to collapse, since the
35 shelves are normally of a collapsible type in order that



carts take up less space when transported empty. This problem appears even if, for example, light cells are used in a manner known per se for stopping a lifting platform at precisely predetermined positions.

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The object of the present invention is to eliminate these problems listed above and to provide a filling apparatus which functions without disturbance even when the distances between the shelves or the positions of the shelf levels vary somewhat, and which at the same time prevents the collapsing of the shelves while packages are being pushed in. Furthermore, the object is to provide an apparatus which rectifies the position of the package layer supporting level after a transfer device operating with a constant stroke length has brought the lifting platform to a position roughly corresponding to a certain shelf.

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In order to achieve these objects, the apparatus according to the invention is characterized in that the lifting devices for a grouping platform, or respectively a rack, are fitted to produce a rapid transfer, having a predetermined distance at each given time, the distance having been dimensioned in such a way that the grouping platform remains without fail above the receiving level and that at least the grouping platform supporting part which supports the package layer is equipped with a first set of power means to transfer the supporting part towards the receiving level in such a way that it can push in part beyond the edge of the receiving level, and with a second set of power means for producing an additional transfer in a vertical direction in such a way that with the aid of these power means the supporting part can be moved as far as the receiving level, the first and the second set of power means of the supporting part having been fitted to operate in the said order.

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According to a preferred embodiment of the invention, the supporting part is fitted movably to the grouping platform, and the power means producing the additional movements are fitted between the grouping platform and the supporting
5 part.

That edge of the supporting part which comes over the receiving level is preferably thinned out so that there is formed for the packages as smooth a passage area as
10 possible from the supporting part to the receiving level. If the said thinned-out edge overlaps the shelf a distance of about 10 cm, it effectively prevents the shelf from collapsing when a layer of packages is pushed in.

15 The invention and its other characteristics and advantages are described below in greater detail in the form of an example and with reference to the accompanying drawing, in which

20 Figure 1 depicts a schematic side view of a filling apparatus according to the invention and the cart, when the lifting platform is on its way downwards, and Figure 2 depicts also a side view of the same apparatus, the product supporting level being at the level of the
25 shelf.

In the figures, reference numeral 1 indicates in general a cart rack, which is of the type used, for example, in shops for the transport and storage of milk products
30 and so forth. The cart has successively several shelves one on top of another, of which three, indicated by 2, 3 and 4, are shown in the figures. The cart is attached to the filling device, either raised or resting on the base, supported by wheels. The filling apparatus, of which only
35 a part is depicted, comprises a grouping or lifting



platform, which is in general indicated by numeral 5. The lifting platform can, like an elevator, be transferred upwards and downwards along guides, the lifting movement being produced by pneumatic or hydraulic or electric power means. The grouping platform according to the figures has been thought to be transferred by means of lifting chains and a principal cylinder in such a way that the cylinder stroke length corresponds to one interval between the shelves. The movements for the transfer of the grouping platform are depicted schematically by arrows a on the left in Figure 1. It is evident that, respectively, by the constant stroke length the cart 1 can be moved as is indicated by dotted arrows b in the figure on the right.

To the lifting platform there is attached a turning supporting plate 6, on top of which the milk cartons 10 have been placed and the back edge 14 of which has been articulated to a sliding sleeve 16. The front edge of the supporting plate 6 rests on the support wheels 9 in the lifting platform.

The support wheels 9 are installed in turning arms 17, which are operated either each by a separate or by a mutual pneumatic cylinder 18.

The sleeve 16 moves supported by a bar 7 in the lifting platform, and this movement is produced by a cylinder 8. Furthermore, there is in the lifting platform another cylinder 11, which by its long stroke produces the transfer of the cartons 10 into the shelf interval in question, when the supporting level has first been set correctly.

The operation of the apparatus described is as follows. Since the positions of the shelves of a cart rack may vary



somewhat, the principal movement of the grouping platform has been adjusted so that the platform is always left about 20 mm above the corresponding level 2, 3, 4. The arms 17 of the supporting wheels 9 are at this time in their vertical position.

Thereafter the cylinder 8 is started in order to transfer the supporting level 6 to the right between the shelves so that the front edge 15 of the supporting level pushes over the level 2 over a distance of about 10 cm. Thereafter the cylinder 18 is started in order to turn the arms 17 down and to lower the turning supporting level 6 on top of the shelf level 2. The stroke of the cylinder 18 is so long that, in spite of variation of the shelf levels the supporting wheels 9 always detach from the supporting plate. The supporting level 6 is now without fail in the correct position in relation to the shelf 2, and the cartons 10 can be pushed between the shelves in the cart rack by means of the cylinder 11. The thinned-out front edge 15 of the supporting level 6 forms on the one hand a smooth passage to the shelf 2, and in addition, it prevents the shelf from being collapsed by the friction force of the cartons. The shelves 2, 3 and 4 normally have transverse articulations, which are not shown in the figures.

In the embodiment depicted in the figures, there is fitted to the arm 17 a limit switch 12, which is situated in alignment with the front edge of the supporting level 6. When the supporting level detaches from the supporting roll 9, the actuator 13 of the limit switch 12 can move, thereby activating the switch. The switch affects the pushing cylinder 11, its purpose being to prevent the operation of the cylinder 11 in a case of disturbance, i.e. if the supporting part 6 for some reason does not detach from the wheels 9.



Claims

1. An apparatus for filling a transport or storage rack (1) of the type which has several receiving levels (2, 3, 4), situated at predetermined intervals one on top of another, on which one layer of packaged products (10) or the like is placed at each given time, the filling apparatus comprising a grouping platform (5) and lifting devices for raising and lowering the grouping platform (5), or respectively the rack (1), in a vertical direction to predetermined positions, and the grouping platform is equipped with a pushing device (11) for pushing a layer of packages arranged on the platform to the corresponding receiving level (2) in the transport rack,
c h a r a c t e r i z e d i n that the devices for lifting the grouping platform (5), or respectively the rack (1), are fitted so as to produce a rapid transfer over distance predetermined in each given case, the distance having been dimensioned so that the grouping platform (5) is without fail left above the receiving level (2), and that at least the supporting part (6) of the grouping platform, which supports the layer of packages (10), is equipped with a first set of power means (8) for transferring the supporting part (6) towards the receiving level (2) in such a way that it can push in part beyond the edge of the receiving (2) level, and with a second set of power means (18) in order to produce an additional transfer in a vertical direction in such a way that by these power means the supporting part can be moved as far as the receiving level (2), the first and second set of power means (8, 18) of the supporting part (6) having been fitted to operate in the said order.

2. An apparatus according to Claim 1,
c h a r a c t e r i z e d i n that the supporting part (6) is fitted movably to the grouping platform (5),



and that the power means (8,18) producing the additional movements are installed between the grouping platform (5) and the supporting part (6).

3. An apparatus according to Claim 2,
c h a r a c t e r i z e d i n that the supporting
part (6) is attached turnably by means of bearings to
the grouping platform (5) in such a way that the
5 horizontal turning axis is situated furthest from that
front edge which overlaps the receiving level (2).
4. An apparatus according to Claim 3,
c h a r a c t e r i z e d i n that the said front edge
is supported by supporting wheels (9), the said wheels
being capable of being raised and lowered in relation to
5 the grouping platform (5).
5. An apparatus according to Claim 4,
c h a r a c t e r i z e d i n that the wheels (9)
are installed at the ends of turnable (17) arms, the
turning movement being produced by power cylinders (18)
5 situated between the arms (17) and the grouping platform
(5).
6. An apparatus according to any of the above claims,
c h a r a c t e r i z e d i n that, in addition, there
have been fitted to the grouping platform (5) switch
means (12) which change their state when the supporting
5 part (6) is lowered to rest on the receiving level (2),
and a change in the state of the switches releases the
pushing device (11) so that it will carry out the pushing
movement.
7. An apparatus according to Claim 6,
c h a r a c t e r i z e d i n that the sensors (12)



comprise a microswitch which opens when the supporting wheels (9) detach from the supporting part (6).

8. An apparatus according to any of the above claims, characterized in that the edge (15) of the supporting part (6) overlapping the receiving level has been thinned out so that as even a passage area as possible is formed for the packages (10) from the supporting part (6) to the receiving level (2).

9. An apparatus according to any of the above claims, in which the receiving level is a cart (1) shelf (2, 3, 4) of the type which can be collapsed for transporting the cart when empty, characterized in that the supporting part (6) has been fitted to overlap the shelf a distance of about 10 cm.



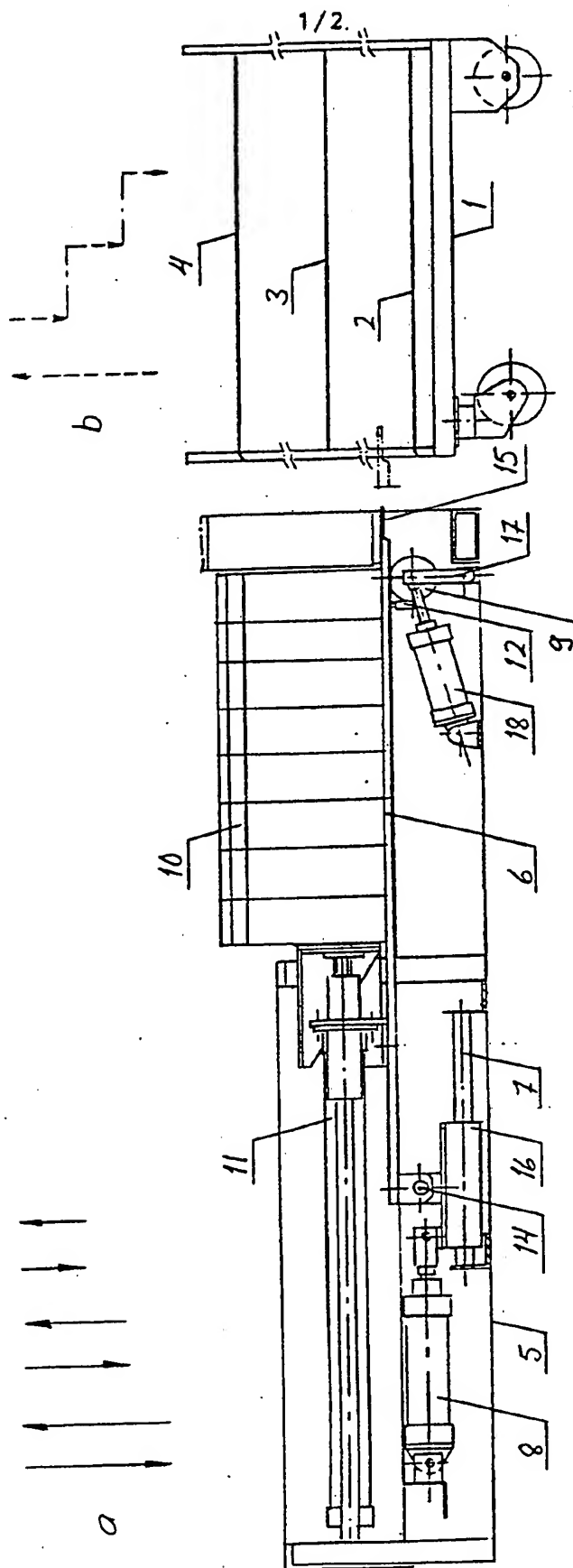
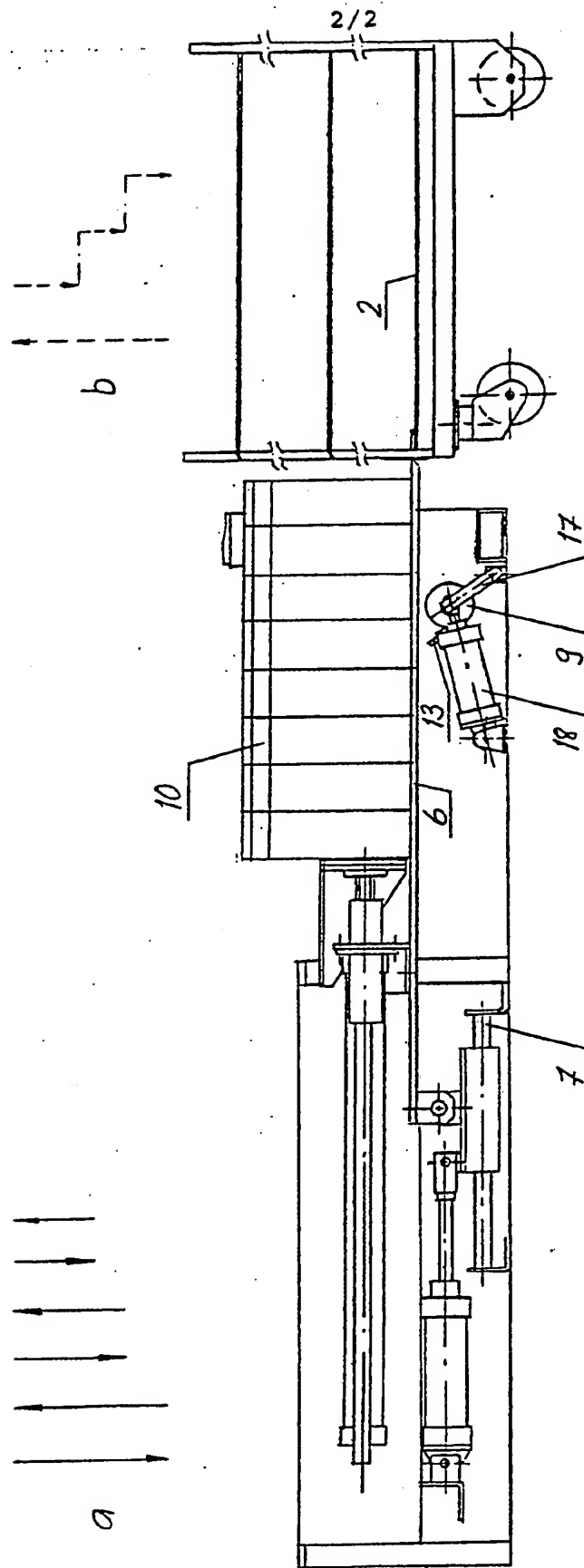


FIG. 1

SUBSTITUTE SHEET





SUBSTITUTE SHEET



INTERNATIONAL SEARCH REPORT

International Application No PCT/FI83/00031

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ¹		
According to International Patent Classification (IPC) or to both National Classification and IPC 3		
B 65 G 67/04		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
IPC 3 US C1	B 65 G 57/22-57/26, 67/00-67/04, 67/14, 67/20 214:16.6; 38, 41; 414:277-280, 352, 353, 373-402, 572-590	
Documentation Searched other than Minimum Documentation to the extent that such Documents are Included in the Fields Searched ⁵		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category ¹⁵	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X	US, A , 3 637 095 (D H KAMPFER) 25 January 1972	1
Y	DE, B , 2 431 542 (OKURA YUSOKI K.K.) 22 March 1979	1
A	SE, C , 194 745 (VERKSTADS AB MEKANO) 23 February 1965	1
A	SE, C , 210 323 (T-B KÄLLSTRÖM) 10 January 1967	1
A	SE, B , 322 731 (H GRÄSVOLL, K I WEINER, G G MAGNUSSON) 13 April 1970	1
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search ²	Date of Mailing of this International Search Report ³	
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